

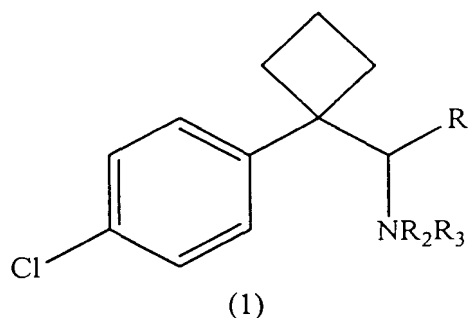
## CLAIMS

What is claimed is:

1. A method of preparing a compound of Formula 1:

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- or a pharmaceutically acceptable salt, solvate, clathrate, hydrate, or prodrug thereof, wherein  $R_1$  is substituted or unsubstituted alkyl, substituted or unsubstituted aralkyl, substituted or unsubstituted heteroalkyl, substituted or unsubstituted aryl, substituted or unsubstituted heterocycle; and  $R_2$  and  $R_3$  together form a cyclic structure or each of  $R_2$  and  $R_3$  is independently substituted or unsubstituted alkyl, substituted or unsubstituted aralkyl, substituted or unsubstituted heteroalkyl, substituted or unsubstituted aryl, substituted or unsubstituted heterocycle, which comprises contacting a compound of Formula 2:

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- Chemical structure (2) shows a 4-chlorophenyl ring connected to a quaternary carbon atom. This quaternary carbon is also bonded to a cyclobutyl ring, an  $R_1$  group, and a nitrogen atom. The nitrogen atom is bonded to an  $R_2$  group and a sulfonate group ( $-SO_3^-$ ), where the sulfur atom is positively charged and the oxygen atom is negatively charged. The sulfonate group is also bonded to an  $X$  group.
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- wherein  $X$  is independently a polymer bound alkyl, aryl or heteroalkyl; substituted or unsubstituted alkyl; substituted or unsubstituted aralkyl; substituted or unsubstituted heteroalkyl; substituted or unsubstituted aryl; substituted or unsubstituted ether; substituted or unsubstituted ester; substituted or unsubstituted ketone; substituted or unsubstituted phosphonate; substituted or unsubstituted phosphonic acid ester; substituted or unsubstituted phosphinoyl; substituted or unsubstituted sulfide; substituted or unsubstituted sulfone; substituted or unsubstituted sulfinyl imine; substituted or unsubstituted heterocycle; or  $-NR_4R_5$ , wherein  $R_4$  and  $R_5$  together with the nitrogen atom to which they are attached form
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a heterocycle or each of  $R_4$  and  $R_5$  is independently hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted heteroalkyl, substituted or unsubstituted aralkyl, substituted or unsubstituted aryl, substituted or unsubstituted ether, substituted or unsubstituted sulfide, or substituted or unsubstituted heterocycle; with a reagent capable of  
5 cleaving a nitrogen-sulfur bond under conditions suitable for the formation of the compound of Formula 1.

2. The method of claim 1 wherein the compounds of formulas 1 and 2 are stereomerically pure.

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3. The method of claim 1 wherein the compound of Formula 1 is provided as a pharmaceutically acceptable salt.

4. The method of claim 3 wherein the compound of Formula 1 is provided as an  
15 acetic, benzenesulfonic, benzoic, camphorsulfonic, citric, ethenesulfonic, fumaric, gluconic, glutamic, hydrobromic, hydrochloric, isethionic, lactic, maleic, malic, mandelic, methanesulfonic, mucic, nitric, pamoic, pantothenic, phosphoric, succinic, sulfuric, tartaric, or p-toluenesulfonic salt.

20 5. The method of claim 1 wherein  $R_1$  is lower alkyl, optionally substituted with one or more hydroxyl groups.

6. The method of claim 5 wherein  $R_1$  is  $-\text{CH}_2\text{CH}(\text{CH}_3)(\text{CH}_2\text{OR}_4)$ ,  $-\text{CH}(\text{OCH}_2\text{OCH}_3)\text{CH}(\text{CH}_3)_2$ ,  $-\text{CH}_2\text{CH}(\text{CH}_3)_2$ ,  $-\text{CH}_2\text{C}(\text{CH}_3)_2\text{OR}_4$ , or  
25  $-\text{CH}_2\text{C}(\text{OR}_4)(\text{CH}_2\text{OR}_4)\text{CH}_3$ , wherein  $R_4$  is alkyl, heteroalkyl, heteroaryl, aryl, hydrogen, acyl, carbonate, carbamate, ester, or urea.

7. The method of claim 1 wherein  $R_2$  is not the same as  $R_3$ .

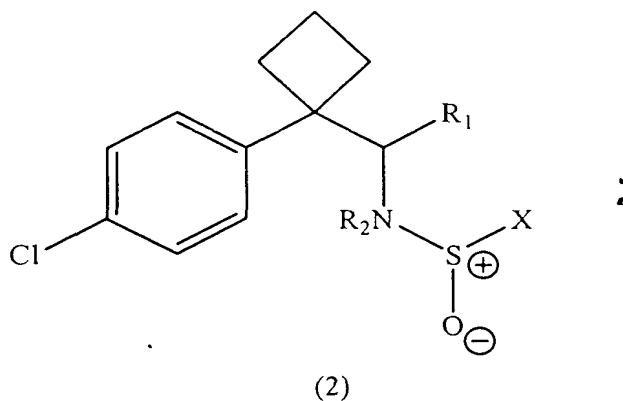
30 8. The method of claim 1 wherein  $R_2$  and  $R_3$  are both hydrogen.

9. The method of claim 1 wherein X is substituted or unsubstituted aralkyl, substituted or unsubstituted heterocycle, substituted or unsubstituted heteroalkyl, or substituted or unsubstituted heteroaryl.

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10. The method of claim 1 wherein X is alkyl.

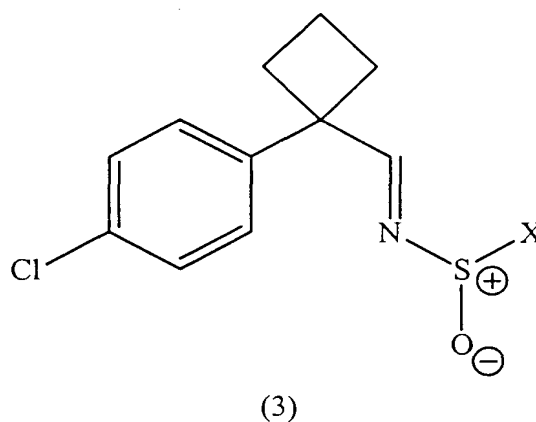
11. The method of claim 1 wherein X is aryl.
12. A method of preparing a compound of Formula 2:



which comprises contacting a compound of Formula 3:

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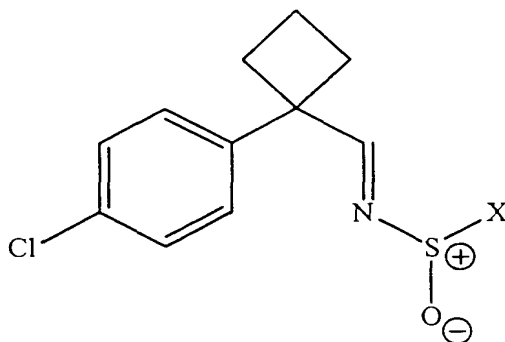
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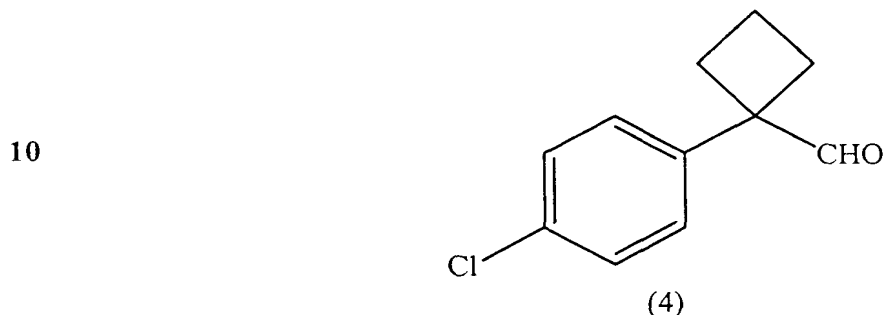
- 15 with a Lewis acid or a base and a compound of the formula  $R_1M$ , wherein X is independently a polymer bound alkyl, aryl or heteroalkyl; substituted or unsubstituted alkyl; substituted or unsubstituted aralkyl; substituted or unsubstituted heteroalkyl; substituted or unsubstituted aryl; substituted or unsubstituted ether; substituted or unsubstituted ester; substituted or unsubstituted ketone; substituted or unsubstituted phosphonate; substituted or unsubstituted phosphonic acid ester; substituted or unsubstituted phosphinoyl; substituted or unsubstituted sulfide; substituted or unsubstituted sulfone; substituted or unsubstituted sulfinyl imine; substituted or unsubstituted heterocycle; or  $-NR_4R_5$ , wherein  $R_4$  and  $R_5$  together with the nitrogen atom to which they are attached form a heterocycle or each of  $R_4$  and  $R_5$  is independently hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted heteroalkyl, substituted or unsubstituted aralkyl, substituted or unsubstituted aryl, substituted or unsubstituted ether, substituted or unsubstituted sulfide, or substituted or
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unsubstituted heterocycle; and M is CdZ, BaZ, Na, K, MgZ, ZnZ, Li, MnZ, CuZ, TiZ<sub>3</sub>, or In, and Z is Cl, Br, I, aryl, aralkyl, alkoxy, or heterocycle under conditions suitable for the formation of the compound of Formula 2.

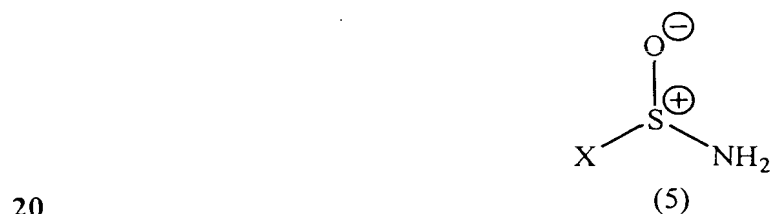
- 5            13.        A method of preparing a compound of Formula 3:



which comprises contacting a compound of Formula 4:



- 15 with a compound of Formula 5:



- wherein X is independently a polymer bound alkyl, aryl or heteroalkyl; substituted or unsubstituted alkyl; substituted or unsubstituted aralkyl; substituted or unsubstituted heteroalkyl; substituted or unsubstituted aryl; substituted or unsubstituted ether; substituted or unsubstituted ester; substituted or unsubstituted ketone; substituted or unsubstituted phosphonate; substituted or unsubstituted phosphonic acid ester; substituted or unsubstituted phosphinoyl; substituted or unsubstituted sulfide; substituted or unsubstituted sulfone; substituted or unsubstituted sulfinyl imine; substituted or unsubstituted heterocycle; or
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-NR<sub>4</sub>R<sub>5</sub>, wherein R<sub>4</sub> and R<sub>5</sub> together with the nitrogen atom to which they are attached form a heterocycle or each of R<sub>4</sub> and R<sub>5</sub> is independently hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted heteroalkyl, substituted or unsubstituted aralkyl, substituted or unsubstituted aryl, substituted or unsubstituted ether, substituted or  
5 unsubstituted sulfide, or substituted or unsubstituted heterocycle; under conditions suitable for the formation of the compound of Formula 3.

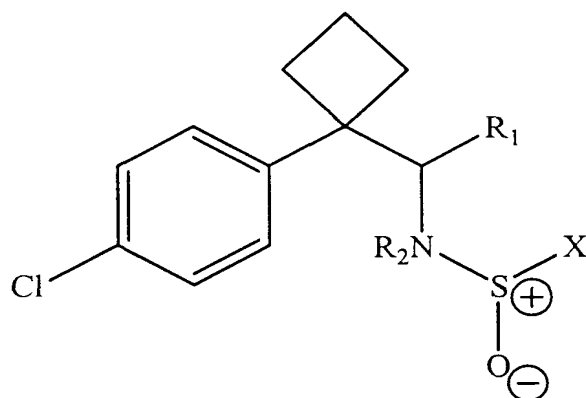
14. The method of claim 13 wherein the compound of Formula 5 is stereomerically pure.

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15. The method of claim 13 wherein the compound of Formula 5 is (R)-*tert*-butylsulfonamide, (S)-*tert*-butylsulfonamide, (R)-triethylmethylsulfonamide, or (S)-triethylmethylsulfonamide.

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16. A compound of Formula 2:



or a salt, solvate, clathrate, hydrate, or prodrug thereof, wherein each of X is independently a polymer bound alkyl, aryl or heteroalkyl; substituted or unsubstituted alkyl; substituted or unsubstituted aralkyl; substituted or unsubstituted heteroalkyl; substituted or unsubstituted aryl; substituted or unsubstituted ether; substituted or unsubstituted ester; substituted or  
20 unsubstituted ketone; substituted or unsubstituted phosphonate; substituted or unsubstituted phosphonic acid ester; substituted or unsubstituted phosphinoyl; substituted or unsubstituted sulfide; substituted or unsubstituted sulfone; substituted or unsubstituted sulfinyl imine; substituted or unsubstituted heterocycle; or -NR<sub>4</sub>R<sub>5</sub>, wherein R<sub>4</sub> and R<sub>5</sub> together with the nitrogen atom to which they are attached form a heterocycle or each of R<sub>4</sub> and R<sub>5</sub> is  
25 independently hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted heteroalkyl, substituted or unsubstituted aralkyl, substituted or unsubstituted aryl, substituted

or unsubstituted ether, substituted or unsubstituted sulfide, or substituted or unsubstituted heterocycle; and  $R_1$  is independently substituted or unsubstituted alkyl; substituted or unsubstituted aralkyl; substituted or unsubstituted heteroalkyl; substituted or unsubstituted aryl; and  $R_2$  is hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted aralkyl, or substituted or unsubstituted aryl.

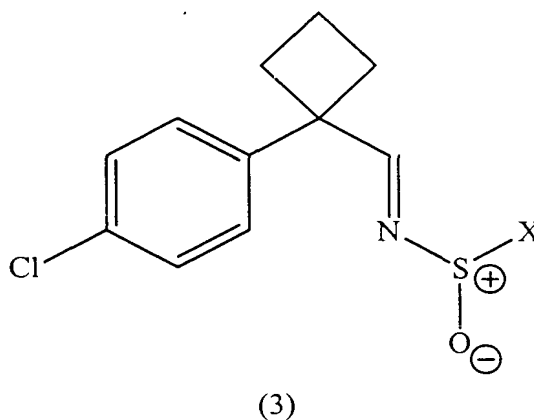
17. The compound of claim 16 wherein  $R_1$  is lower alkyl, optionally substituted with one or more hydroxyl groups.

18. The compound of claim 17 wherein  $R_1$  is  $-\text{CH}_2\text{CH}(\text{CH}_3)(\text{CH}_2\text{OR}_4)$ ,  $-\text{CH}(\text{OCH}_2\text{OCH}_3)\text{CH}(\text{CH}_3)_2$ ,  $-\text{CH}_2\text{CH}(\text{CH}_3)_2$ ,  $-\text{CH}_2\text{C}(\text{CH}_3)_2\text{OR}_4$ , or  $-\text{CH}_2\text{C}(\text{OR}_4)(\text{CH}_2\text{OR}_4)\text{CH}_3$ , wherein  $R_4$  is alkyl, aryl, H, acyl, carbonates, carbamates, and ureas.

19. The compound of claim 16 wherein X is alkyl.

20. The compound of claim 16 wherein X is substituted or unsubstituted aryl.

21. A compound of Formula 3:



22. or a salt, solvate, clathrate, hydrate, or prodrug thereof, wherein X is substituted or unsubstituted alkyl, substituted or unsubstituted aralkyl, or substituted or unsubstituted aryl.

23. The compound of claim 21 wherein X is alkyl.

24. The compound of claim 21 wherein X is substituted or unsubstituted aryl.

24. The compound of claim 16 or 21 wherein said compound is stereomerically pure.

25. The method of claim 2 or 13 wherein the desired stereoisomer is greater than 5 about 90 percent pure.

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